Sustainable Water Management Initiative
Technical Subcommittee

Presentation Title: A Case for Supplemental Metrics

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A Case for Supplemental Metrics To Support Stream Categorization

Charles B. Cooper

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- Premise: A metric used to categorize a stream should represent the species reasonably expected to be present in the stream

The presently proposed fluvial density metric is unrepresentative for Eastern/coastal MA warm-water streams

- The species used to derive the metric are generally absent from Eastern/coastal MA warm-water streams

- Those that are present fail to show an abundance correlation with flow reduction in the present analysis

All Eastern/ Coastal Streams default to "Category 5" because the designated fluvial species are largely restricted to the Central/Western portion of MA, or cold-water (USGS Table 2)

Species	No. of Individuals	% of Individuals
Blacknose dace	25,254	36%
White sucker	8,086	11%
Longnose dace	8,015	11%
Brook trout	7,316	10%
Fallfish	5,532	8%
Slimy sculpin	5,466	8%
Common shiner	5,132	7%
Creek chub	1,940	3%
Brown trout	1,818	3%
Tesselated darter	1,815	3%
Landlocked salmon	258	0%
Longnose sucker	237	0%
Creek chubsucker	156	0%
Rainbow trout	46	0%
Cutlips minnow	40	0%
Tadpole madtom	7	0%
Total	71,118	

Eastern Coldwater Cent./Western

- More than 80% of the fish collected were either central/western MA species or cold-water species

- For the two eastern/warm-water species, white sucker and fallfish, the USGS July, 2009 “fish/flow” study found (p.22) :

“ The low slope and wide confidence intervals of the regression lines for fallfish and white sucker indicate that, for this dataset, there is little to no relation between relative abundance of these species and percent alteration of August median flow for net-depleted sites.”

Suggestion: Perform supplemental analysis of year-class abundance of target species in collections made following reduced-flow years

Location/timeframe	Min flow as % of June-Oct mean	Observed % of Year-1 Fallfish	Expected % of Year-1 Fallfish
Pawcatuck Drainage, 1960-1965	32%	25-38%	25-38%
Lamprey, 2003	4%	6%	25-38%

- For warm water streams, derive expected year-class percentages of fallfish from the length-frequencies of the ~5,500 fallfish in the MA data base

- For cold water streams, derive expected year-class percentages of brook trout from the length-frequencies of the ~7,300 brook trout in the MA data base

- Compare and derive flow-related abundance metric for categorization based on differences in observed to expected percentages in targeted reduced-flow years like 2002, 1999

- Estimated level-of-effort, less than 100 person-hours